

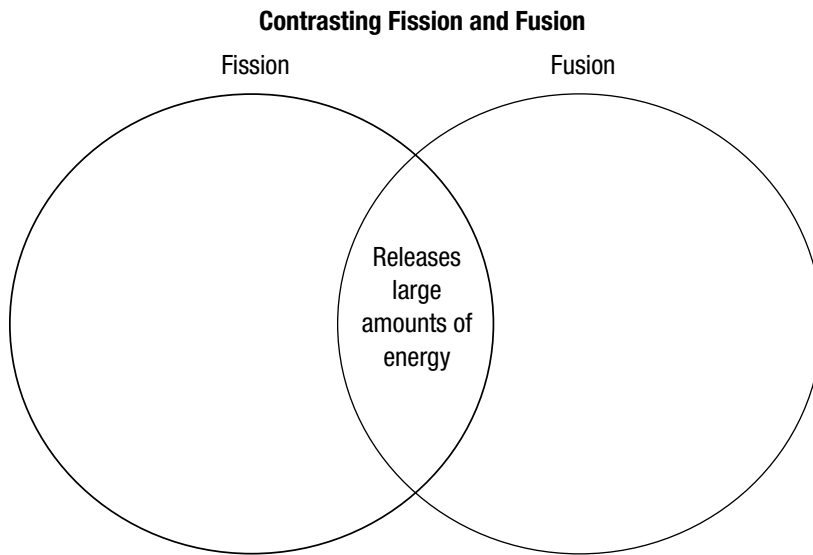
Chapter 10 Nuclear Chemistry

Section 10.4 Fission and Fusion**(pages 308–315)**

This section discusses nuclear forces and the conversion of mass into energy. It also describes the nuclear processes of fission and fusion.

Reading Strategy (page 308)

Comparing and Contrasting As you read, contrast fission and fusion in the Venn diagram below by listing the ways they differ. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

**Nuclear Forces (pages 308–309)**

1. Describe the strong nuclear force. _____

2. Is the following sentence true or false? Over very short distances, the strong nuclear force is much greater than the electric forces among protons. _____
3. Electric forces in atomic nuclei depend on _____.
4. Is the following sentence true or false? The strong nuclear force on a proton or neutron is much greater in a large nucleus than in a small nucleus. _____
5. All nuclei with 83 or more protons are _____.

Fission (pages 309–313)

6. Describe fission. _____

7. Fission can produce very large amounts of energy from very small amounts of _____.

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8. Circle the letter that identifies what c represents in Einstein's mass-energy equation, $E = mc^2$.
- a. the charge on a proton b. the speed of light
c. the charge on an electron d. the specific heat of the material
9. Is the following sentence true or false? During nuclear reactions mass is not conserved, but energy is conserved.
- _____

10. Describe what can happen to a uranium-235 nucleus that absorbs a neutron. _____
- _____

11. Complete the following table.

Chain Reactions		
Type of Chain Reaction	Description	Example of An Application
Uncontrolled	All neutrons released during fission are free to cause other fissions.	
		Nuclear power plants

12. Describe a critical mass. _____
- _____

13. Is the following sentence true or false? Unlike power plants that burn fossil fuels, nuclear power plants do not emit air pollutants such as oxides of sulfur and nitrogen. _____

14. Describe what happens during a meltdown. _____
- _____

Fusion (page 315)

15. The state of matter in which atoms have been stripped of their electrons is _____.
16. Circle the letter of each main problem that scientists must face in designing a fusion reactor.
- a. Extremely high temperatures are necessary for a fusion reaction to start.
b. The plasma that results from the reaction conditions must be contained.
c. The hydrogen needed as a starting material is extremely scarce.
d. Fusion reactions produce large quantities of radioactive waste.